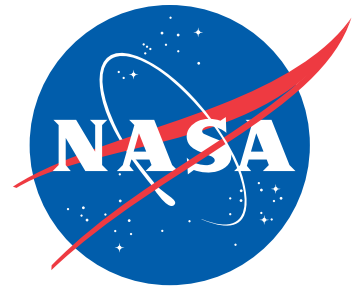


Spaceport News

John F. Kennedy Space Center - America's gateway to the universe



Crawler-transporter passes latest test



CLICK ON PHOTO

NASA/Frankie Martin

Crawler-transporter No. 2 returns to its park site after completion of testing at Launch Pad 39A at Kennedy Space Center on Nov. 21. The activity is designed to check out recently completed modifications to ensure the crawler-transporter's ability to carry launch vehicles such as the Space Launch System

Major overhaul keeps workhorse prepared for future missions

By Bob Granath
Spaceport News

For more than 45 years, two crawler-transporters have carried America's human spaceflight program on their backs. This past year at Kennedy Space Center, crawler-2 underwent a major overhaul to keep the workhorse

going for many years to come. With the first phase of modification work complete, the crawler recently went for a successful test drive that proved all upgrades are working as designed.

The behemoth crawlers are designed to lift the mobile launchers with launch vehicles mounted atop, then move the entire integrated stack from the Vehicle Assembly Building (VAB), where launch vehicles have been assembled since the Apollo era, to the ocean-side launch pads.

"It's like having a 'car' that is almost 50 years old," said Mary Hanna, crawler-transporter project

manager in the Vehicle Integration and Launch Branch of Ground Systems Development and Operations. "We're going to need this special vehicle for many years to come, so it was time for a tuneup."

manager in the Vehicle Integration and Launch Branch of Ground Systems Development and Operations. "We're going to need this special vehicle for many years to come, so it was time for a tuneup."

Weighing six and a half million pounds and larger in size than a professional baseball infield, the crawlers creep along at a maximum speed of one mile per hour when carrying a mobile launcher with a launch vehicle atop. Unloaded, the crawlers can manage about two miles per hour.

While big and slow, the crawlers play a crucial role.

Like much of the infrastructure at Kennedy, the crawlers were constructed in the mid-1960s to move the Apollo Saturn V rockets that took American astronauts to the moon and launched the Skylab and Apollo-Soyuz Test Project missions. Through three decades of space shuttle flights, the crawlers served in the same role until the final space shuttle mission in 2011.

Last December, engineers began modifying crawler-2 to ensure its ability to carry launch vehicles currently in development to the launch

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Scientist leads way



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Workers test Orion seal for launch tower's arm

By Bob Granath
Spaceport News

Preparations for the launch of the new Orion spacecraft took an important step forward. A prototype seal for the launch tower's crew access arm (CAA) was successfully tested at the Kennedy Space Center's Launch Equipment Test Facility (LETF).

The simulation evaluated the new technology used in the design and function of the inflatable seal. The assessment team used mockups of Orion's outer mold line and the access arm White Room to evaluate the performance of the seal while simulating vehicle to CAA work.

"The testing went very well and proved the concept works," said Kent Batchelor, a senior mechanical engineer with Stinger Ghaffarian Technologies Inc. (SGT), working under the space agency's Engineering Services Contract.

"We want to do the best we can to protect the hatch area of Orion," he said. "The seal will give us a watertight connection between the White Room and the spacecraft."

The Orion spacecraft is designed to take crews of up to four astronauts on missions to deep space including asteroids and, eventually, Mars. The initial Orion launch will be atop a United Launch Alliance Delta IV rocket. Later the spacecraft will be sent beyond low-Earth orbit by the Space Launch System.

For either rocket, the crew access arm attaches to Orion near the top of the launch umbilical tower. At the end is a box-like clean room that moves to within inches of the crew module's hatch.

Prior to flight, the CAA and White Room provide technicians access to the Orion spacecraft. On launch day, the flight crew will ascend the launch tower's elevator and walk across the access arm to enter the Orion from the White Room.

While this is the same concept used for Apollo and the space shuttle, the inflatable seal is an innovation. The final inches between the White Room and the Orion will be filled by the tube-like seal pressing against the spacecraft.

A White Room mockup structure was designed and fabricated to hold the prototype seal in place. The White Room, with the seal attached, was fixed on a pedestal next to the vehicle motion simulator (VMS). The Orion outer mold line then was attached to the VMS at the LETF.

Design of the seal and preparations for the test have been ongoing for the past few months. Confirmation that the design would, in fact, work came on Nov. 14.

"We originally planned for the test to stretch over two days," Batchelor said, "but it went so well, we completed the task in one."

The assessment included ensuring the seal did not press too hard against Orion. The pressure is designed to be firm enough to keep rainwater out, but only press from 0.15 to 0.3 pounds per square inch.

"We want to protect the Orion, but we don't want to damage it either," Batchelor said.

Protection against Florida's typical weather is another concern. Wind can cause the launch vehicle to move from side to side. Dynamic



CLICK ON PHOTO

NASA/Jim Grossmann

The Orion spacecraft crew access arm seal prototype is being checked out at the Launch Equipment Test Facility at Kennedy Space Center. The tests include a mockup of the vehicle outer mold line and the White Room that would be at the end of the access arm. Testing simulated work going on in the White Room while attached to the Orion.

testing with the VMS demonstrated that the launch vehicle could sway up to eight inches in and out and 16 inches from side to side with the seal remaining in place.

"While the CAA should be rock solid, the launch vehicle may move slightly on Florida's windy days," he said. "The seal fit well against the simulated Orion exterior and kept out water that was sprayed from above to simulate rain. This was a good demonstration that the access arm seal can stand up to wind and rain while continuing to protect Orion and keep the White Room clean."

Batchelor pointed out that testing showed some minor design changes will be necessary.

"During some of the tests, the seal collapsed improperly, but it looks like a few changes should take care of that," he said.

Ultimately, the verification testing showed the innovative concept works.

"I'm very proud of the team," Batchelor said.

"Overall, our checks verified that the seal will not damage the spacecraft and can provide the needed protection."



CLICK ON PHOTO

NASA/Jim Grossmann

Monitoring test activity at Kennedy's Launch Equipment Test Facility, from left, are Kent Batchelor, lead for Stinger Ghaffarian Technologies; Kelli Maloney, NASA lead; and Clayton Grosse, Nelson Engineering lead. The prototype seal for the launch tower's crew access arm was successfully tested on Nov. 14.

Combined Federal Campaign a success

By Frank Ochoa-Gonzales
Spaceport News

Kennedy Space Center workers had the opportunity to support more than 2,700 CFC charities that help people locally, nationally, and across the world by donating to the 2012 Combined Federal Campaign (CFC).

This year about 1,400 members of the Kennedy civil servant workforce came together to raise \$488,632, just shy of the \$490,000 goal.

"This team always strives to meet and exceed all goals set before us," CFC chair Jennifer Tharpe said. "We knew that with the tough economic times we are all facing, it would be a worthy challenge to work to reach our CFC goal. I am so grateful for the generosity of the members of this great NASA family who were able to contribute to the wonderful causes CFC helps, which allowed us to come so very close to the goal. Raising nearly a half-million dollars will make a huge difference for thousands of people."

This year, KSC is celebrating its 50th anniversary and its 50th year participating in the CFC.

"This team not only launches spacecraft to the heavens, but it gives a bit of heaven back to those in need here on Earth," Kennedy Director Bob Cabana said. "When you look around at the challenges others face in our community and nation, you realize how fortunate we in the KSC community are."

The total Kennedy family, including contractors, contributed more than \$1 million this year.

More online

For more information about Kennedy Space Center's Combined Federal Campaign, go to <http://cfc.ksc.nasa.gov/index.htm>.

Lift and tilt prepares Atlantis for display at visitor complex

By Linda Herridge
Spaceport News

Positioned near the center of its new home, space shuttle Atlantis, still in its protective shrink wrap, is surrounded by scaffolding and ascending concrete floors as construction continues on the 90,000-square-foot exhibit at the Kennedy Space Center Visitor Complex.

In mid-November, engineers, technicians and heavy-lift specialists from Ivey's Construction, Beyel Brothers, and BRPH, along with technical support from United Space Alliance, raised Atlantis 26 feet from the ground level.

This feat was achieved using support equipment from Kennedy Space Center's Orbiter Processing Facilities, four 800-ton jacks provided by Beyel, and large blocks of wood, or dunnage, to gradually elevate Atlantis into position.

Earlier this week, Atlantis, minus its wheels and tires, was slowly tilted to exactly a 43.21 angle to the portside atop steel stands. Its portside wingtip is only 7.5 feet off the ground, while its nose



CLICK ON PHOTO

NASA/Dimitri Gerondidakis

Construction work continues on space shuttle Atlantis' new home at the Kennedy Space Center Visitor Complex on Nov. 27. Inside the building, Atlantis, still in its protective shrink-wrap covering, has been lifted 26 feet above ground level and tilted at a 43.21 angle to the portside.

is 26.5 feet off the ground. The front and aft beams are attached to Atlantis at locations used for shuttle ferry flights.

About two months earlier, Ivey's performed a test lift at Beyel Brothers' Cocoa site using a steel shell filled with enough concrete blocks to simulate the orbiter's weight.

Ivey's project manager Steve Sergis said the test went very well with no unexpected problems.

"Our history with Ken-

nedy goes back 40 years," Sergis said. "Getting Atlantis into position for display has been an honor for us. We have a great team."

"This angle will allow optimum viewing of Atlantis with its payload bay doors open," said Tim Macy, the director of project development and construction for Delaware North Companies Parks & Resorts at the visitor complex.

Lifting and tilting would not have been possible if the building had not been ready,

according to Macy.

"Crews worked three shifts at times to make sure that everything above Atlantis was 98 percent complete," Macy said. "That way we don't have to work over her and risk damage to the vehicle."

"This has been a huge engineering feat," said Andrea Farmer, senior public relations manager at the visitor complex. "We took our time to be very careful along the way."

"I think we are, as a team,

cognizant of our responsibility to tell the story that would make everybody that was involved in the project proud. We are excited about the possibilities for the future," Macy said.

Farmer added, "Atlantis will tell the 30-year history of NASA's Space Shuttle Program for years to come and inspire generations."

Macy said the construction team is very aware that Atlantis is important to those who work on her and those living in the region.

From **TEST**, Page 1

pad, such as the Space Launch System (SLS) heavy-lift rocket, the agency's heaviest launch vehicle yet.

"After a month of work at the crawler yard park site, we moved inside the VAB," Hanna said. "This gave us access to the heavy cranes and it provided weather protection over the past 10 months."

The modifications and upgrades include 45 different tasks, 32 of which were being tested the week of Nov. 5.

"It's been a major team effort with support from several of our contractors," Hanna said. "Space program operations contractor United Space Alliance (USA) orchestrated the overall effort with QinetiQ North America, Met-Con Inc.

and Ivey's Construction Inc."

According to Terry Berman, project lead for USA, bringing the crawler up to state-of-the-art technology will be crucial for future launch operations at Kennedy.

"Our plan was to replace aging power equipment and bring the controls up to 21st century standards," Berman said. "The major efforts focused on replacing the original sets of AC (alternating current) electrical generators, upgrading the brakes and preparing crawler-transporter-2 for lifting the additional weight of the SLS rockets."

The heaviest SLS rollout weight, including the mobile launcher, is estimated to be about 14.2 million pounds. That compares to the Apollo Saturn V and space shuttle rollout weight of approxi-

mately 12.3 million pounds.

With the first phase of modifications complete, crawler-2 began a test drive that took place over several days. At Launch Pad 39A, the crawler picked up a shuttle-era mobile launcher platform and moved up and down the pad ramp to test how well the systems worked while carrying a load.

"It began early on Nov. 5," Hanna said. "The crawler was driven out to the launch pad for a thorough validation of all the recent modifications. We've been very pleased at how well everything has worked."

With the checkouts at Launch Pad 39A concluded, crawler-2 returned to its park site near the VAB. Modification work is scheduled to continue after the first of the year.

"We expect to have the crawler

back in the VAB by January 2013 to continue the remaining work," Hanna said.

"The next round of work," Berman said, "will include replacing the jacking and leveling cylinders and the roller-bearing assemblies to accommodate the additional weight of the Space Launch System rocket."

Existing roller bearings will be replaced with a redesigned assembly that can carry the greater load. The redesign also will include an improved lubrication system and temperature monitoring to provide a longer operational life.

"Everything we've tested has gone very well," Hanna said. "The team has done an outstanding job. By the end of 2015 we should be ready to do final testing to show we're ready for the SLS."

Scenes Around Kennedy Space Center



NASA/Jim Grossmann

NASA Railroad locomotive No. 3 (right) is moved into position above the wheel assemblies previously used by locomotive No. 2 inside Kennedy Space Center's Rotation, Processing and Surge Facility on Nov. 28. Watch for an in-depth look at this first-time operation in the next issue of Spaceport News.



NASA/Ben Smegelsky

Kennedy Space Center celebrated America Recycles Day on Nov. 15. Employees recycled items such as alkaline batteries, electronic equipment such as cell phones, computers and TVs. Workers also donated clothing in good condition including coats, gloves, hats, scarves, shoes, undergarments, socks and belts.



NASA/Ben Smegelsky

Roseate spoonbills and other feathered friends flash mob an area near the Central Instrumentation Facility at Kennedy Space Center on Nov. 15.



For NASA

Sid Champagne, right, WFTV photographer receives the 2012 Harry Kolcum Memorial News and Communications Award from National Space Club Florida Committee chairman Jim McCarthy on Nov. 13.

National Space Club Florida Committee honors Kolcum winners

The National Space Club Florida Committee named Sid Champagne, WFTV photographer, and Emily Perry, USAF Space and Missile Museum curator, the 2012 Harry Kolcum Memorial News and Communications Award winners Nov. 13. Named for the late aerospace writer who worked for Aviation Week & Space Technology, the Kolcum award recognizes the contributions of professional journalists and communicators to inform the public about launch operations from the spaceport.



For NASA

Emily Perry, right, USAF Space and Missile Museum curator, is all smiles as she accepts the 2012 Harry Kolcum Memorial News and Communications Award from National Space Club Florida Committee chairman Jim McCarthy on Nov. 13.

Scientists: Trash soon to become space resource

By Steven Siceloff
Spaceport News

NASA researchers focusing on the difficulties of traveling into deep space have identified an unusual source for fuel that astronauts will be carrying with them anyway: trash.

Scientists say there is a good chance that food wrappers, used clothing, scraps, tape, packaging and other garbage accumulated by a crew of four astronauts flying beyond low-Earth orbit can be turned into valuable methane gas, oxygen and even water using processes and much smaller versions of devices that already are doing the same thing on Earth.

"We're trying to change the mindset. We don't want to just think of waste as something that occurs, we want to think of waste as a resource," said Paul Hintze, task leader of the trash-to-gas project at Kennedy Space Center.

Hintze's group of six researchers at Kennedy and groups from NASA centers in Ohio, California and Texas wrote in a recent paper that the current methods of handling trash -- either carry-



NASA/Dimitri Gerondidakis

Paul Hintze shows some of the materials Nov. 29 that the trash reactor will have to incinerate during a space mission. Most of the items the team uses in studies are stand-ins for the real things astronauts take with them. The products range from food items to used clothing.

ing it along on the round trip through space or gathering it into an expendable module and burning it up in Earth's atmosphere -- are not suitable answers for missions that go beyond Earth orbit or even past the moon.

Working in a laboratory at Kennedy, Hintze's team built an 80-pound device that

looks like a three-foot-long metal pipe to test theories about incinerating a variety of trash ranging from used clothes to uneaten food. The reactor holds more than three quarts of material and burns at about 1,000 degrees F, about twice the maximum temperature of an average household oven. It's expected

to take astronauts four hours to burn a day's worth of trash from a crew of four.

During the course of a year in space -- one half the length of time a mission to Mars is expected to take -- trash processing for a crew of four would create about 2,200 pounds of methane fuel, enough to power a launch from the lunar surface, Hintze said.

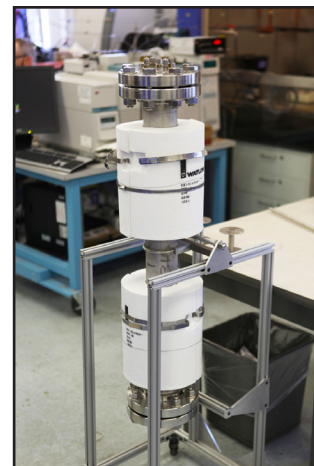
"The longer the mission, the more applicable this technology is," Hintze said. "If you're just doing a two-week mission, you wouldn't want to take along something like this because you wouldn't get anything out of it."

Converting garbage into fuel also would keep astronauts from turning their cramped space capsule into an orbiting landfill.

The research also holds potential for use on Earth in areas of the world where there are neither large power plants nor garbage processing facilities. Using smaller reactors, villages could dispose of their own waste and reap the benefits or an extra source of fuel. The military and other organizations are interested in the project because of the potential to use reactors in remote locations to save on fuel shipping costs.

"Not only will the effort help space missions but also on Earth because we have enough problems dealing with our own trash," said Anne Caraccio, a chemical engineer working on the project.

Finding the right materials to handle the pressure of the extreme temperature without melting is the primary engineering hurdle at this point, said Stephen Anthony, a fluids design engineer at Kennedy. The experimental version of the reactor is made of steel, but the team expects to employ a different



NASA/Dimitri Gerondidakis

The latest prototype reactor developed in the trash-to-gas project weighs about 80 pounds and is built to safely handle a burning process that takes several hours and reaches 1,000 degrees F. A space-ready version will have to be smaller, lighter and include many automatic features.

alloy for future versions.

"The materials that we're using, they lose so much strength that we've had to really oversize the reactor so we have thick walls and large flanges that look fine on a piece of lab equipment but are much tougher to translate into an actual system that can go into a space station or a habitat where size and weight are at a significant premium," Anthony said.

The high temperature is necessary to completely break down materials and destroy potential microbes in the food or other waste. There is also a higher standard for the reactor in space than on Earth because the closed environment in a spacecraft demands that no smell or other potential hazard from the burning process come into the crew area.

"On Earth, a little bit of an odor is not a problem, but in space a bad smell is a deal breaker," Hintze said.

A flight-ready model that can be tried out on the International Space Station could fly as soon as 2018.



NASA/Dimitri Gerondidakis

Anne Caraccio operates an experimental reactor Nov. 29 that was developed to test the concepts of burning trash in space and using the gases released in the process to provide resources for the spacecraft and crew.

Panel shares experience with hearing impaired students

By Kay Grinter
Reference Librarian

Being able to hear a rocket roar off the pad is not a requirement for a successful career at NASA as 30 students from Osceola County learned Nov. 13 during their visit to Kennedy Space Center.

A panel of ten deaf professionals delivered that message "loud and clear" to the students who are all deaf or hearing impaired. Twenty of the students attend special classes at Osceola High School and 10, at Neptune Middle School.

The visit was arranged

More information online

For more information on Kennedy Space Center's diversity programs, visit <http://odeo.ksc.nasa.gov> or go to the Diversity and Inclusion Committee of and for Employees (DICE) website at <http://dice.ksc.nasa.gov>.



NASA/Gina Mitchell-Ryall

Kennedy Space Center's Education Office hosted a program and tour for 30 University of North Florida-sponsored hearing impaired students on Nov. 13. The majority of the students were from Osceola High School.

by sign language interpreter Jennifer Rogers as part of her graduate coursework at the University of North Florida, and co-sponsored by Kennedy's Office of Diversity and Equal Opportunity and the Education and External Relations Directorate.

Among the professionals on the panel were Ed Tugg and Apurva Varia of NASA, Martin Ayers of Lockheed Martin, and William Deters

of SpaceX, all of whom had a common theme: "If we could do it, you can, too."

Their collective goal was to inspire the students to stay in school and study hard to become career professionals themselves someday.

The panel also was moderated by Jessica Connor, a graduate-level Pathways intern majoring in counseling. Connor, who is herself deaf, will be converted to a permanent, full-time NASA

position in Kennedy's Office of Diversity and Equal Opportunity in January after her graduation.

Following the presentation held in the Training Auditorium, the students were treated to a tour of Kennedy that included stops at the Vehicle Assembly Building, Launch Pad 39A and the Apollo/Saturn V Center.

"They loved it, absolutely

loved it," said Lisa Allen, Diversity and Inclusion Program manager at Kennedy. "They didn't know that deaf people worked at Kennedy, and they got to see a variety of options here for what they could do with their lives."

Kennedy's various Employee Resource Groups sponsor similar events for targeted student populations throughout the year.



NASA/Gina Mitchell-Ryall

Kennedy Space Center's Education Office hosted a program Nov. 13 designed to expose middle and high school students to hearing impaired professional employees and their work environment.

Kennedy scientist leads national research society

By Bob Granath
Spaceport News

For the past year, a NASA scientist at the Kennedy Space Center has led one of the pre-eminent microgravity research organizations in the United States. Howard G. Levine, Ph.D., chief scientist in the International Space Station (ISS) Ground Processing and Research Directorate, has served as president of the American Society for Gravitational and Space Research (ASGSR).

A nonprofit organization founded in 1984, ASGSR provides a forum to foster research, education and professional development in the multidisciplinary fields of gravitational space biological and physical sciences.

"We work to bring together a diverse group of scientists and engineers from academia, government and industry to exchange ideas about space research," Levine said. "Our mission also includes encouraging

science education and outreach."

Members of ASGSR share interests in how living organisms and physical systems respond to the microgravity environment of space and the many broad-reaching questions regarding how biological processes work in extraterrestrial environments.

"By bringing people together, we share ideas on how to do experiments, hear from those involved in ongoing investigations and encourage the peer review process for soliciting the best spaceflight research possible," Levine said.

Levine believes these activities are important for NASA now that construction of the space station is complete and the orbiting laboratory has moved to the era of utilization.

"The nation and our international partners invested a great deal of resources in the station, and now we can begin to reap the benefits," he said. "The ASGSR is a forum to encourage scientists to consider



NASA/Jim Grossmann

Howard G. Levine, Ph.D., chief scientist in the International Space Station Ground Processing and Research Directorate, inspects a Petri Dish Fixation Unit (PDFU) and the Biological Research In Canisters on Nov. 20 that hold the PDFUs when flown in space.

developing experiments for the ISS."

Research on the space station has already led to numerous important discoveries such as learning that the food poisoning microbe Salmonella increases in virulence when grown in space.

Researchers are using this dis-

covery to develop new candidate vaccines.

Nutrition studies conducted on the space station have shown that diets rich in Omega-3 fatty acids are correlated with reduced bone loss. Additionally, drugs have been validated in the microgravity of space that helps decrease both bone and muscle loss among bedridden patients on Earth.

A novel air scrubber developed for a spaceflight plant growth chamber is now in widespread use on Earth for food preservation and in homes and offices, killing 98 percent of airborne pathogens that pass through it. Altered gene functions in plants and other organisms flown in space have provided insights into the function of metabolic pathways that would not have been achievable based on Earth studies alone.

"We want others to know how to utilize the space station," he said, "so we can maximize the benefits for everyone here on Earth."

Physicist stumbles upon raindrop data breakthrough

By Steven Siceloff
Spaceport News

A physicist and researcher who set out to develop a formula to protect Apollo sites on the moon from rocket exhaust may have happened upon a way to improve weather forecasting on Earth.

Working in his backyard during rain showers and storms, John Lane, a physicist at Kennedy Space Center, found that the laser and reflector he was developing to track lunar dust also could determine accurately the size of raindrops, something weather radar and other meteorological systems estimate, but don't measure.

The special quantity measured by the laser system is called the "second moment of the size distribution," which results in the average cross-section area of raindrops passing through the laser beam.

"It's not often that you're studying lunar dust and it ends up producing benefits in weather forecasting," said Phil Metzger, a physicist who leads the Granular Mechanics and Regolith Operations Lab, part of the Surface Systems Office at Kennedy.

Lane said the additional piece of information would be useful in filling out the complex computer calculations used to determine the current conditions and forecast the weather.

"We may be able to refine (computer weather) models to make them more accurate," Lane said. "Weather radar data analysis makes assumptions about raindrop size, so I think this could improve the overall drop size distribution estimates."

The breakthrough came because Metzger and Lane were looking for a way to calibrate a laser sensor to pick up the fine particles of blowing lunar dust and soil. It turns out that rain is a good stand-in for flying lunar soil.

"I was pretty skeptical in the beginning that the numbers would come out anywhere close," Lane said. "Anytime you do something new, it's a risk that you're just wasting your time."

The genesis of the research was the need to find out how much damage would be done by robotic landers getting too close to the six places on



NASA/Jim Grossmann

John Lane looks over data recorded from his laser system Nov. 16 as he refines his process and formula to calibrate measurements of raindrops.

the moon where Apollo astronauts landed, lived and worked.

NASA fears that dust and soil particles thrown up by the rocket exhaust of a lander will scour and perhaps puncture the metal skin of the lunar module descent stages and experiment hardware left behind by the astronauts from 1969 to 1972.

"It's like sandblasting. If you have something coming down like a rocket engine, and it lifts up this dust, there's not air so it just keeps going fast," Lane said. "Some of the stuff can actually reach escape velocity and go into orbit."

Such impacts to those materials could ruin their scientific value to researchers on Earth who want to know what happens to man-made materials left on another world for more than 40 years.

"The Apollo sites have value scientifically and from an engineering perspective because they are a record of how these materials on the moon have interacted with the solar system over 40 years," Metzger said. "They are witness plates to the environment."

There also are numerous bags of waste from the astronauts laying up there that biologists want to examine simply to see if living organisms can survive on the moon for almost five decades where there is no air and there is a constant bombardment of cosmic radiation.

"If anybody goes back and sprays stuff on the bags or touches the bags,

they ruin the experiment," Metzger said. "It's not just the scientific and engineering value. They believe the Apollo sites are the most important archaeological sites in the human sphere, more important than the pyramids because it's the first place

humans stepped off the planet. And from a national point of view, these are symbols of our country and we don't want them to be damaged by wanton ransacking."

Current thinking anticipates placing a laser sensor on the bottom of one of the landers taking part in the Google X-Prize competition. The sensor should be able to pick up the blowing dust and soil and give researchers a clear set of results so they can formulate restrictions for other landers, such as how far away from the Apollo sites new landers can touch down.

As research continues into the laser sensor, Lane expects the work to continue on the weather forecasting side of the equation, too. Lane already presented some of his findings at a meteorological conference and is working on a research paper to detail the work.

"This is one of those topics that spans a lot of areas of science," Lane said.



NASA/Jim Grossmann

John Lane examines the reflection of a laser during a demonstration Nov. 16 of the hardware he uses to measure raindrop sizes.



NASA/Ben Smegelsky

Kennedy Space Center workers compare an iPad with the new Microsoft Surface tablet during the Agency Consolidated End-user Services (ACES) Technology Expo on Nov. 14 in the Operations and Support Building II. Microsoft representatives Shawn Carlson, at left, and Todd Hoffman were on hand to answer questions.

ACES expo showcases current, future technologies

By Linda Herridge
Spaceport News

Information Technology simulation and modeling analyst Martin Steele and modeling and simulation engineer David Miranda listened intently as Microsoft technology strategist Shawn Carlson explained features of the new Surface tablet during the Agency Consolidated End-user Services (ACES) 2012 Technology Expo on Nov. 14 at Kennedy Space Center.

"I'm particularly interested in what ACES has or will have available in tablets," Miranda said.

"It's also a great opportunity to learn and talk directly to the vendors," Steele said.

Under the ACES contract, HP Enterprise Services (HPES) provides management, security and maintenance of essential IT services for the agency.

HPES representative Helen Ortel said the purpose of the expo was to showcase current technology and provide a preview of what is on the horizon in new technology and replacement equipment.

Products on display included cell

More online
For more information about ACES, visit
<https://aces.ndc.nasa.gov>.

phones, smart phones, laptops, tablets, and computer hardware and peripherals.

The expo, held from 10 a.m. to 1 p.m. in the Operations and Support Building II, featured exhibits and demonstrations of current offerings, new hardware and some future technology from ACES provider HPES and its partners.

"There is a focus on new technology, including tablets and android technology," Ortel said.

Jeanne O'Bryan, IT acting deputy director at Kennedy, browsed through the exhibits and stopped to talk to vendors and attendees.

"This is an opportunity to see what the ACES team is offering and is proposing to offer as new technology," O'Bryan said.

Partners include Apple, AT&T, Cisco, Citrix Systems Inc., Konica Minolta Business Solutions U.S.A. Inc., Lenovo, Microsoft, Symantec, T-Mobile USA Inc., and Verizon Wireless.

Looking up and ahead . . .

* All times are Eastern

2012

Dec. 19	NASA Launch/Baikonur Cosmodrome, Kazakhstan; Expedition 34/35, Soyuz TMA-07M Launch window: Under review
December	NASA Launch/Wallops Flight Facility, Va.; Orbital Sciences Corporation Test Flight, Antares Launch window: Under review

To watch a NASA launch online, go to <http://www.nasa.gov/ntv>.

In celebration of Kennedy Space Center's 50th anniversary, enjoy this vintage photo . . .

FROM THE VAULT



NASA file/1982

Then Vice President George Bush, center left, is pictured with payload specialist Wubbo Ockels of the Netherlands during the Spacelab arrival ceremony on Feb. 5, 1982, at Kennedy Space Center. The STS-9 mission aboard space shuttle Columbia launched Nov. 28, 1983. It was the first in which a non-American participated.



John F. Kennedy Space Center

Spaceport News

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